

PROPERTY PLANNING COMMON ELEMENTS

COMPONENTS OF MASTER PLANS

HABITATS AND THEIR MANAGEMENT

Northern Hardwoods

Description

This page describes management of the northern hardwoods cover type. Northern hardwoods occur throughout the state, but are more common north of the Tension Zone. Ecologically, northern hardwoods in central and southern Wisconsin are considered distinct from those found in the north.

In northern Wisconsin, northern hardwood forest forms the ‘matrix’ within which most other habitat types are found. It occurs on loamy soils of glacial till plains and moraines deposited by the Wisconsin glaciation. In presettlement times it covered the largest acreage of any Wisconsin vegetation type and still occurs extensively today, although its character is different from what existed historically.

Sugar maple is dominant or co-dominant in most stands. Historically, eastern hemlock was the second most important species, sometimes occurring in nearly pure stands with eastern white pine. Both of these species are greatly reduced in today’s forests. American beech, basswood, white ash, and yellow birch are important associates. Beech can be co-dominant with sugar maple in the counties near Lake Michigan. Many other species can be found as occasional associates in northern hardwood stands. Species such as aspen, red maple, and birch have become more common in many stands after slash fires that affected many areas after the Cutover (late 1800s to 1932).

Characteristic tree species found in the sub-canopy include balsam fir, ironwood, and American elm. Alternate-leaved dogwood, beaked hazelnut, leatherwood, American fly honeysuckle, prickly gooseberry, red elderberry, and maple-leaved arrowwood are typical shrub species. Canada yew was an important shrub historically but is now absent from most of its former range due to excessive deer browse. The groundlayer can vary from sparse and species-poor under hemlock stands, with wood ferns, blue-bead lily, club-mosses, and Canada mayflower, to lush and species-rich with many spring ephemerals such as large-flowered trillium, Dutchman’s-breeches, spring beauty, and trout lilies. Other species include white baneberry, downy Solomon’s-seal, wild sarsaparilla, rose twisted stalk, starflower, maidenhair fern, and lady fern.

In southern Wisconsin, northern hardwoods are most likely to occur on rich, well-drained soils, especially in historically less fire-prone areas such as protected valleys and on north- or east-facing slopes, although they are increasingly succeeding oak stands on mesic or dry-mesic sites, especially where seed sources exist nearby. As in northern Wisconsin, sugar maple typically is the dominant species. Other associates include basswood, white ash, red and white oak, red maple, slippery elm, bitternut hickory, and black walnut. Beech may occur in the eastern counties, near Lake Michigan, though much more so north of the Tension Zone. Yellow birch also is more common in this type northward; in southern Wisconsin, it typically occurs in stream gorges and moist, rocky slopes, often within or near pine or hemlock relicts.

Northern hardwood stands in the south typically have a dense canopy of mostly shade-tolerant species with a sparse shrub understory that may include scattered tree seedlings, saplings, and shrub species such as maple-



leaved viburnum, alternate-leaved dogwood, choke cherry and witch-hazel. Gooseberry often occurs in sites with a history of grazing, and invasive shrubs such as bush honeysuckles and common or glossy buckthorns are becoming increasingly abundant. Common understory species include ‘spring ephemerals’ such as trout lilies, Dutchman’s breeches, spring beauty, false rue anemone, and toothwort. Other common herbs are wild ginger, wild geranium, bishop’s cap, blue cohosh, Virginia waterleaf, woodland phlox, bloodroot, mayapple, trilliums, and violets.

Northern hardwoods were fairly common throughout southern Wisconsin historically, occurring mainly in a “fire shadow” north of the Wisconsin River and east of the Kickapoo Valley in the Western Coulee and Ridges Ecological Landscape (EL), and also in the Southeast Glacial Plains, Southern Lake Michigan Coastal, Western Prairie, Southwest Savanna, and Forest Transition ELs. An additional block of beech-maple-basswood forest occurred in a long, narrow, north-south band along Lake Michigan on both sides of the Tension Zone, mostly in the Central Lake Michigan Coastal EL. Most of these forests were cleared for agriculture after Euro-American settlement, as the soils are very fertile.

Ecological Landscape Opportunities

Ecological Landscape	Opportunity*	
	North of Tension Zone	South of Tension Zone
Central Lake Michigan Coastal	I	I
Central Sand Hills	P	I
Central Sand Plains	I	I
Forest Transition	M	P
North Central Forest	M	
Northeast Sands	I	
Northern Highland	I	
Northern Lake Michigan Coastal	M	P
Northwest Lowlands	I	
Northwest Sands	P	
Southeast Glacial Plains		I
Southern Lake Michigan Coastal		I
Superior Coastal Plain	I	
Southwest Savanna		I
Western Coulee and Ridges	P	M
Western Prairie	P	I

*M = Major: major opportunity exists in this Landscape; many significant occurrences are recorded or restorations likely to be successful.

I = Important: several occurrences important to maintaining the community in the state occur in this Landscape.

P = Present: community is present in the Landscape, but better opportunities exist elsewhere.

Rare Species

Many Species of Greatest Conservation Need (SGCN) are associated with northern hardwoods based on the findings in [Wisconsin’s 2015 Wildlife Action Plan](#). To learn more, visit the [Northern Forest communities page](#) and click on “Northern mesic forest”, and visit the [Southern Forest communities page](#) and click on “Southern mesic forest”.



Threats

- Fragmentation, either by conversion to a non-forest cover type (e.g., development) or conversion of natural forest to plantation, threatens northern hardwood forest communities and reduces habitat for species that require large blocks. This problem is more acute in southern Wisconsin where there is much more “permanent” fragmentation (long-term conversion of native habitats to agricultural, residential, or urban uses).
- A lack of diversity in seral stages can harm both species that require mature forest and those that require areas of early-successional habitat.
- Many northern hardwood forests suffer from ecological simplification – a lack of species and structural diversity needed to support a robust community of plants and animals – due to past and current management practices, invasion by non-native species, and excessive deer herbivory. This reduces habitat for a variety of species and makes forests more vulnerable to pests, diseases, and other environmental stresses.
- Invasive species are a growing threat to northern hardwood forests. Problematic species currently include non-native honeysuckles and buckthorns, garlic mustard, Japanese barberry, multiflora rose, autumn olive, non-native earthworms, and emerald ash borer.
- Browse-sensitive species such as hemlock are threatened by excessive white-tailed deer herbivory.
- Climate change may cause shifts in species composition of northern hardwoods, as some species such as trembling aspen, yellow birch, and hemlock are projected to decrease due to their vulnerability to heat, drought, or fire or their susceptibility to insects or disease.

Management Techniques

- Group selection
- Overstory removal
- Shelterwood
- Single-tree selection
- Passive management
- Site preparation
- Intermediate treatments
- Pesticide treatments

Management Considerations

- Consider landscape composition and structure (species composition; successional stage; age structure; stand/patch size; degree of fragmentation, etc.) when deciding on a management technique. Uneven-aged systems are generally recommended for northern hardwoods. However, a variety of management techniques may be applied depending on the management objectives, including old-growth reserves, managed old forest, extended rotation, un-even-aged management, even-aged management, and maintenance of reserve trees.
- Where possible, manage for larger stands, larger blocks, and to increase connectivity with surrounding forest.



- Limit permanent fragmentation caused by development (roads, landings, etc.).
- Increase species diversity where possible, especially to increase representation of hemlock, yellow birch, white pine, and basswood. Employing a variety of canopy opening sizes with single-tree and group selection can encourage diversity in tree species regeneration.
- Retain hemlock in mixed hemlock-hardwoods stands. Manage these stands using primarily passive management. Encourage hemlock by selectively thinning to remove competing species.
- For hemlock inclusions of >50% hemlock (hemlock, white pine-hemlock, hemlock-hardwood, or hemlock-yellow birch), including sites with regeneration potential, manage according to the recommendations in the Hemlock chapter of the *Old-growth and Old Forests Handbook*.
- In southern Wisconsin, manage for the northern hardwood type where it currently occurs in sites it would have occupied historically (e.g., north- and east-facing slopes, draws, moist microsites within oak forest, etc.).
- In southern Wisconsin, consider management to regenerate oaks, increase representation of oaks, or retain oaks as long as possible whenever feasible.
- Increase representation of older trees and older stands.
- Increase structural diversity within stands (large trees, cavity trees, snags, downed woody debris, variable gap sizes, pit-and-mound microtopography) through retention, selective harvesting, and extended rotation or old-growth management.
- Protect special features such as ephemeral ponds, seeps, riparian areas, cliff faces, and rock outcrops.
- Control and limit deer herbivory.

